

LENOX CHINA
A DIVISION OF LENOX, INC.
POMONA, NEW JERSEY

POMONA DGW AND TCE
QUARTERLY GROUNDWATER
MONITORING REPORT
JANUARY 2001 MONITORING ROUND

PROJECT #35221.001
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1.0 INTRODUCTION

This report summarizes the results from the groundwater monitoring programs that satisfy the requirements outlined in Lenox's NJPDES Discharge to Groundwater (DGW) Permit (permit number NJ0086487) and the Memorandum of Agreement (MOA) between Lenox and NJDEP. All groundwater monitoring and analytical procedures were conducted in accordance with the protocols outlined in the most recently revised Groundwater Sampling and Analysis Plan (GWSAP) and Supplemental Groundwater Sampling and Analysis Plan (SGWSAP) approved by NJDEP.

This report presents the DGW and MOA sampling program data in a single document. The report components are as follows:

- Detection Monitoring Program
- GAC Treatment System Monitoring Program
- Depth to Water and Water Level Elevation Measurements
- TCE Monitoring Program
- SWMU No. 2 and Area of Concern Monitoring Program
- Classification Exception Area/Statistical Analysis Program

The first three items satisfy the DGW permit monitoring requirements with the remaining items addressed by the MOA.

2.0 DETECTION MONITORING PROGRAM (DGW)

The detection monitoring program is covered by the GWSAP and consists of the following:

- Sampling monitoring wells MW-1, MW-3, MW-4, MW-6, MW-9, and MW-10.
- Analyzing the samples for color, total dissolved solids (TDS), sulfate, and total and dissolved lead, zinc and sodium. Samples from MW-1 and MW-9 were also analyzed for ammonia-nitrogen. The field parameters pH, specific conductivity and dissolved oxygen are measured at the time the samples are collected.

The groundwater analytical data are summarized in Tables 1 through 7, Section 2. The laboratory data reports are included in Appendix C.

The January 2001 quarterly detection monitoring results are summarized below:

- Lead concentrations in the filtered samples ranged from less than the laboratory reporting limit of $3.0 \mu\text{g/l}$ to $10.6 \mu\text{g/l}$, with the highest concentration in the sample from well MW-3. Lead concentrations in the unfiltered samples ranged from less than the laboratory reporting limit of $3.0 \mu\text{g/l}$ to $64.2 \mu\text{g/l}$, with the highest concentration in the sample from MW-3. The unfiltered sample from MW-4 contained lead at $10.6 \mu\text{g/l}$. Lead was found in the filtered sample at $8.5 \mu\text{g/l}$. This is the first time since 1993 that lead concentrations in the unfiltered sample from this well exceeded the site-specific groundwater quality standard.

- Zinc concentrations in the filtered samples ranged from less than the laboratory reporting limit of 20.0 $\mu\text{g/l}$ to 2,720 $\mu\text{g/l}$, with the highest concentration in the sample from well MW-3. Zinc concentrations in the unfiltered samples ranged from less than the laboratory reporting limit of 20.0 $\mu\text{g/l}$ to 2,720 $\mu\text{g/l}$, with the highest concentration in the sample from MW-3.
- Sodium concentrations ranged from 6,020 $\mu\text{g/l}$ to 40,100 $\mu\text{g/l}$ and from 6,210 $\mu\text{g/l}$ to 40,900 $\mu\text{g/l}$ in the filtered and unfiltered samples, respectively. The highest sodium concentrations were in the samples from MW-9.
- Color concentrations ranged from less than 5 to 45 CU units, with the highest concentration found in the sample from well MW-3.
- Sulfate was detected at concentrations ranging from less than the 20 mg/l laboratory reporting limit to 127 mg/l, with the highest concentration found in the sample from well MW-4.
- Ammonia-nitrogen was detected in the samples from MW-9 and MW-1 at 0.22 mg/l and less than 0.10 mg/l, respectively.

3.0 GAC TREATMENT SYSTEM MONITORING PROGRAM (DGW)

Groundwater samples from the GAC unit influent, effluent, and mid-point sampling ports are analyzed for TCE and its breakdown products (1,1-DCE, cis/trans 1,2-DCE and vinyl chloride); total and dissolved iron, lead, and zinc; and TDS and TSS. The analytical results are summarized in Table 1 Section 3.

The January 2001 GAC monitoring are summarized below:

- The GAC influent sample contained TCE at 3.58 $\mu\text{g/l}$. The mid-point and effluent samples did not contain TCE at a concentration greater than the 0.28 $\mu\text{g/l}$ laboratory reporting limit. Cis-1,2-dichloroethene, 1,1-dichloroethene, trans-1,2-dichloroethene and vinyl chloride were not detected in the influent, mid-point, or effluent samples at concentrations greater than the laboratory reporting limits.
- Lead concentrations in the unfiltered influent and effluent samples were 20 $\mu\text{g/l}$ and 24 $\mu\text{g/l}$, respectively. Lead was not detected in the unfiltered mid-point or in the filtered influent, mid-point and effluent samples at a concentration greater than the laboratory reporting limit.
- Zinc concentrations in the unfiltered influent, mid-point, and effluent samples were 1,200 $\mu\text{g/l}$, 30 $\mu\text{g/l}$, and 140 $\mu\text{g/l}$, respectively. Zinc concentrations in the filtered influent, mid-point, and effluent samples were 350 $\mu\text{g/l}$, 30 $\mu\text{g/l}$, and 80 $\mu\text{g/l}$, respectively.

- Iron concentrations in the unfiltered influent, mid-point, and effluent samples were 4,250 $\mu\text{g/l}$, 120 $\mu\text{g/l}$, and 170 $\mu\text{g/l}$, respectively. Iron concentrations in the filtered influent, mid-point, and effluent samples were 2,620 $\mu\text{g/l}$, 70 $\mu\text{g/l}$, and 70 $\mu\text{g/l}$, respectively.
- TDS concentrations in the influent, mid-point, and effluent samples were 94 mg/l, 87 mg/l, and 89 mg/l, respectively.
- TSS concentrations were less than the laboratory reporting limit in the mid-point and effluent samples, and 3.8 mg/l in the influent sample.

4.0 DEPTH TO WATER, GROUNDWATER ELEVATIONS AND TREATMENT SYSTEM FLOW MONITORING (DGW)

4.1 Depth to Water and Groundwater Elevations

The January 22, 2001 groundwater elevation data are summarized in Table 1 Section 4. Depth to water at the shallow wells on the south and north sides of the plant which screen the same interval as the recovery wells were used to develop the groundwater elevation map (Figure 1). The groundwater flow direction is northeast, which is consistent with previous measurements.

Depth to water measurements made January 22, 2001 at the well points installed downgradient of the recovery wells were plotted to develop the water level elevation and groundwater flow direction maps shown on Figures 3 and 4.

4.2 Treatment System Flow Monitoring

In an April 18, 2000 letter to Lenox, NJDEP requested that Lenox propose an "Average Daily Volume" (ADV) that establishes the minimum pumping volume to adequately capture the TCE plume. The ADV would be calculated by dividing the total volume of groundwater extracted by the recovery system each month by the number of days in the month and reported quarterly to NJDEP. Lenox proposed in a May 19, 2000 letter to NJDEP an ADV of 268,000 gallons per day, which was based on the results of groundwater modeling and the empirical water level and groundwater chemistry data developed since the recovery system started in 1991.

During the period Dec. 1 through Dec. 31, 2000 the calculated ADV was 359,000 gallons per day. During the period Jan. 1 through Jan. 31, the calculated ADV was 351,000 gallons per day. During the period Feb. 1 through Feb. 28, the calculated ADV was 341,000 gallons per day.

5.0 TCE MONITORING PROGRAM (MOA)

5.1 Background

A groundwater investigation performed at the Lenox China facility between January 1987 and February 1990 by Geraghty & Miller (G&M) identified two TCE plumes emanating from an antecedent drum storage pad and degreaser sump. Both antecedent waste handling areas are no longer in use. A second on-site degreaser sump was removed from service in June 1993. Lenox initiated a quarterly groundwater monitoring program to delineate and track the TCE plumes identified by G&M. The monitoring results were also used to design the GWCAS.

5.2 Field Procedures

Groundwater samples were collected from 15 monitoring wells at the Lenox facility and along White Horse Pike on January 22 and 23, 2001. All sampling was performed in accordance with the most recently revised (April 1996) Groundwater Sampling and Analysis Plan and Supplemental Groundwater Sampling, Analysis, and Monitoring Plan approved by the NJDEP.

Lenox installed a 3/4 inch I.D. pump column attached to a one foot section of well screen in each well used to monitor the TCE remediation system prior to the May 1993 sampling round. The bottom of the pump column screen was set approximately two feet above the top of the well screen to ensure that the total volume of standing water in the well casing was removed during purging. A peristaltic pump was attached to the top of the pump column using drinking water grade polyethylene tubing to purge each well. Three to five times the volume of standing water in each well were removed and field parameters (pH, specific conductivity, temperature, and dissolved oxygen) were monitored during the purging process.

The field parameter data are shown on the well sampling logs in Appendix A. Samples for metals analysis were collected directly from the discharge of the peristaltic pump. New drinking water grade polyethylene tubing was used to purge and sample each well to avoid cross-contamination. Samples for VOC analysis were collected with 60 cc Teflon bailers dedicated to each well.

Unfiltered samples were analyzed for VOCs (USEPA Method 502.2), iron, zinc, lead, TDS and TSS. Filtered samples were analyzed for iron, zinc, and lead. Field blank and duplicate samples were collected during the monitoring program and trip blanks supplied by the laboratory were analyzed for quality assurance purposes. All analyses were performed by Accutest, Dayton, New Jersey (NJDEP Certification No. 12129).

Accutest Laboratories notified Gannett Fleming on January 25, 2001 that the VOC vials containing the sample from MW-79A were broken when received by the laboratory. Gannett Fleming directed Accutest to remove an aliquot from one of the MW-79A unpreserved sample containers and to analyze this sample for VOCs. As the sample was not stored or preserved in an appropriate VOC container, the resulting analytical data from this well should be considered an estimated value.

5.3 Groundwater Monitoring Results

The groundwater analytical data are summarized in Tables 1, 2, 3 and 4, Section 5 and the extent of TCE in groundwater during the January 2001 monitoring round is shown on Figure 2. The laboratory data reports are included in Appendix C.

The January 2001 monitoring round results are summarized below:

- TCE concentrations increased at monitoring wells MW-10, MW-12S, MW-15, MW-B-31, MW-76, MW-78 and MW-81 since the last monitoring round. The largest increase occurred at MW-10 (5.2 µg/l to 11.5 µg/l).
- TCE concentrations decreased at monitoring wells MW-13, MW-25, B-59 and MW-79A since the last monitoring round. The largest decrease occurred at MW-79A (2.6 µg/l to 1.0 µg/l).
- TCE concentrations remained unchanged at less than the laboratory reporting limit at wells MW-1, MW-75 and MW-80 and at 2.8 µg/l at well MW-77.
- Cis 1,2-dichloroethene was detected in the samples from well MW-10 and MW-79A at 2.9 µg/l and 1.3 µg/l, respectively. 1,1-dichloroethene was detected in the sample from MW-79A at 2.0 µg/l. No other TCE breakdown products were found in the samples from these or the remaining wells at concentrations exceeding the laboratory reporting limits.
- Iron concentrations in the unfiltered samples ranged from less than the laboratory reporting limit of 0.1 mg/l to 1.370 mg/l, with the highest concentration in the sample from well MW-15. Except for the sample from MW-15, iron was not found in the filtered samples at a concentration exceeding the 0.1 mg/l laboratory reporting limit. The MW-15 sample contained iron at 1.0 mg/l.
- Lead concentrations in unfiltered and filtered samples did not exceed the 0.003 mg/l laboratory reporting limit in any sample.

- Zinc concentrations in the unfiltered samples ranged from less than the laboratory reporting limit of 0.02 mg/l to 0.266 mg/l, with the highest concentration in the sample was from MW-15. In the filtered samples, zinc concentrations ranged from less than the laboratory reporting limit of 0.02 mg/l to 0.219 mg/l, with the highest concentration in the sample from well MW-15.
- TDS concentrations ranged from less than the laboratory reporting limit of 10 mg/l to 229 mg/l, and TSS concentrations ranged from less than the laboratory reporting limit of 4 mg/l to 10 mg/l. The highest TDS and TSS concentrations were in the samples from wells MW-10 and MW-15, respectively.
- There was good agreement between analyte concentrations in the field and duplicate samples from monitoring well MW-75. VOCs, iron, lead, zinc and TSS were not detected in the trip and field blank samples at concentrations exceeding laboratory reporting limits. TDS was detected at 61 mg/l in the January 23 field blank.

The monitoring data indicate that TCE concentrations in samples from the sentinel wells along White Horse Pike wells increased at wells MW-76 and MW-78, decreased at well MW-79A and remained unchanged at 2.8 µg/l at well MW-78 and less than the laboratory detection limit at MW-75 since the last monitoring round. TCE concentrations were at or exceeded the NJDEP 1 µg/l groundwater standard in the samples from wells MW-77 (2.80 µg/l), MW-78 (1.20 µg/l) and MW-79A (1.0 µg/l).

6.0 SWMU No. 2 AND AREA OF CONCERN MONITORING PROGRAM (MOA)

6.1 Groundwater Monitoring Results

The groundwater sampling data from monitoring wells MW-10, MW-17, MW-72, MW-73 and MW-74 are used to assess groundwater quality downgradient of Solid Waste Management Unit (SWMU) No. 2 and the Area of Concern (AOC). Unfiltered and filtered samples from these wells were analyzed for lead and zinc. The groundwater analytical data are summarized in Table 1 Section 6. The laboratory data reports are included in Appendix C.

The January 2001 monitoring round results for SWMU No. 2 and AOC are summarized below:

- Lead concentrations in the unfiltered samples ranged from less than the laboratory reporting limit of 0.003 mg/l to 0.0274 mg/l (MW-73). Lead was not found in the filtered samples at a concentration exceeding the laboratory reporting limit of 0.003 mg/l.
- Zinc concentrations in the unfiltered samples ranged from less than the laboratory reporting limit of 0.02 mg/l to 0.0870 mg/l (MW-74). In the filtered samples, zinc concentrations ranged from less than the laboratory reporting limit of 0.02 to 0.0769 mg/l (MW-17).

7.0 CLASSIFICATION EXCEPTION AREA / STATISTICAL ANALYSIS PROGRAM

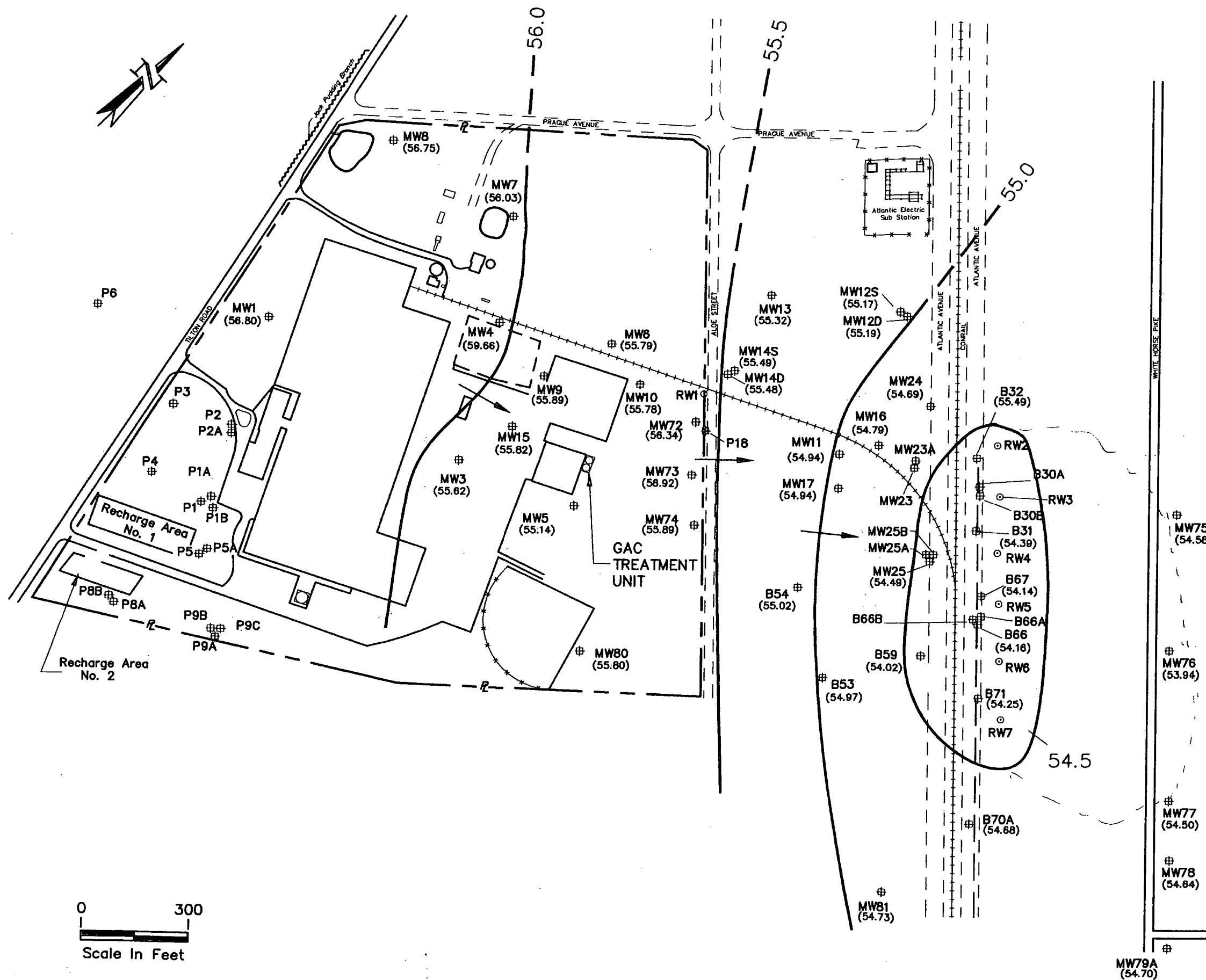
(MOA)

The groundwater sampling data from MW-1, MW-3F, MW-6F, MW-12S, MW-13, MW-73, MW-74, MW-75, MW-79A are used to assess groundwater quality downgradient of the Lenox facility. Unfiltered and filtered samples from these wells were analyzed for lead and zinc. The groundwater analytical results are summarized in Table 1 Section 7. The laboratory data reports are included in Appendix C.

The January 2001 monitoring round results for the CEA/Statistical Analysis Program are summarized below:

- Lead concentrations in the unfiltered samples ranged from less than the laboratory reporting limit of 0.003 mg/l to 0.0274 mg/l (MW-73). Lead was not found in any of the filtered samples at a concentration exceeding the laboratory reporting limit of 0.003 mg/l.
- Zinc concentrations in the unfiltered samples ranged from less than the laboratory reporting limit of 0.02 to 0.0870 mg/l, with the highest concentration in the sample from MW-74. Zinc concentrations in the filtered samples ranged from less than the laboratory reporting limit of 0.02 to 0.0391 mg/l (MW-74).
- TCE concentrations, as summarized in Table 1 Section 5, ranged from less than the laboratory detection limit of 0.27 µg/l to 28.8 µg/l, with the highest concentration in the sample from well MW-25. TCE concentrations in the sentinel wells along White Horse Pike ranged from less than the 0.30 µg/l laboratory reporting limit at well MW-75 to 2.80 µg/l at well MW-77.

In accordance with the CEA monitoring program, the sentinel well TCE monitoring data developed over the past eight consecutive quarters was statistically analyzed using the Mann-Whitney U Test. The results are summarized in Table 2 Section 7. The null hypothesis, defined as the population means of the current and previous year data set are the same, was accepted at the 90 percent confidence level at wells MW-76, MW-77, MW-78 and MW-79A, indicating that TCE concentrations at these wells have statistically remained the same or increased over the monitoring periods ending October 2000 and January 2001.



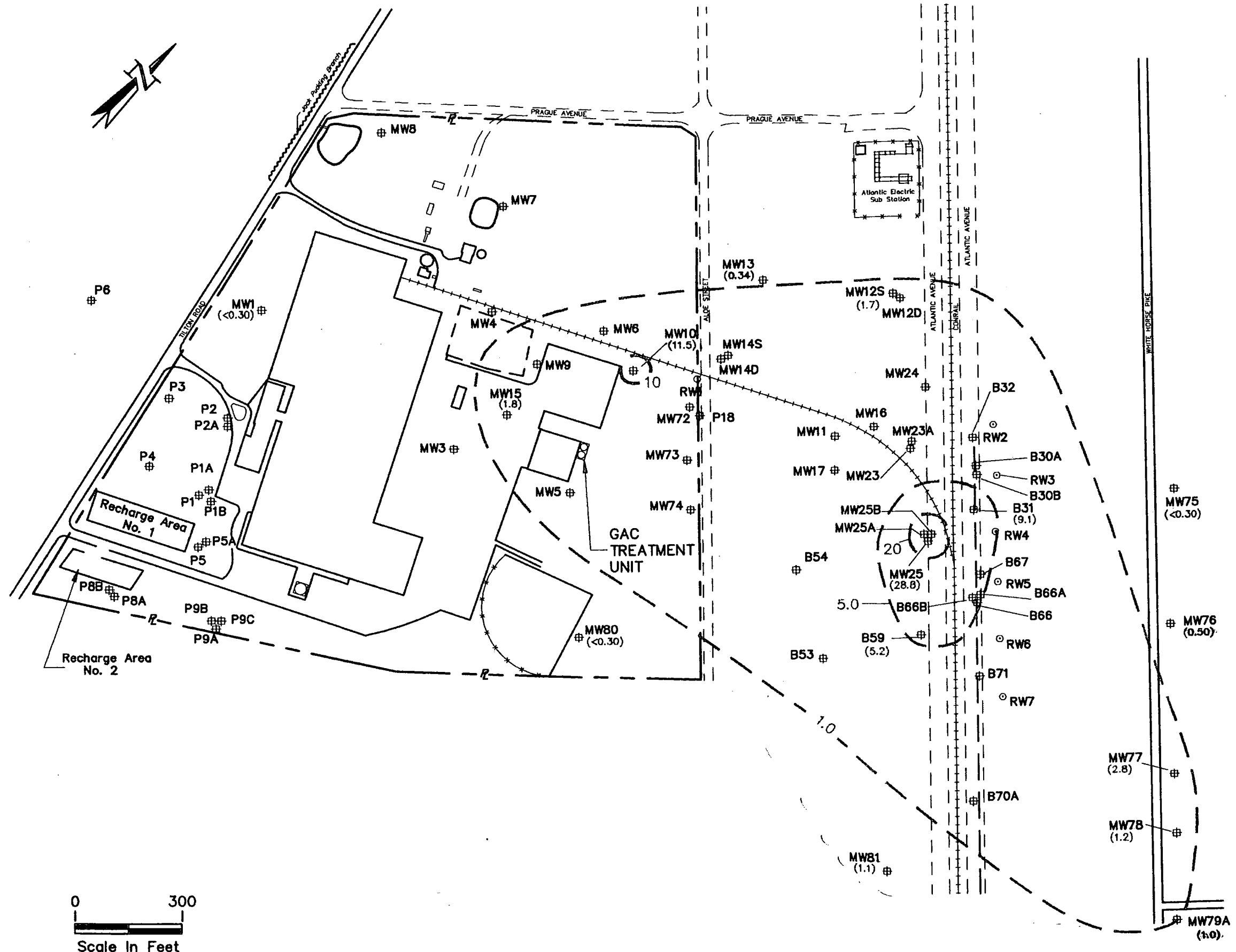
- LEGEND**
- B66 (54.16) # Location Of Monitoring Well With Groundwater Elevation
 - RW5 # Location Of Recovery Well
 - 56.0 — Line Of Equal Water Level Elevation In Feet Above MSL (Dashed Where Inferred)
 - Groundwater Flow Direction

NOTE:
Base Map Obtained From
Geraghty & Miller's August 1992
Groundwater Monitoring Report.

GROUNDWATER ELEVATIONS AND GROUNDWATER FLOW MAP JANUARY 22, 2001

LENOX CHINA
POMONA, NEW JERSEY

0 300
Scale In Feet



LEGEND

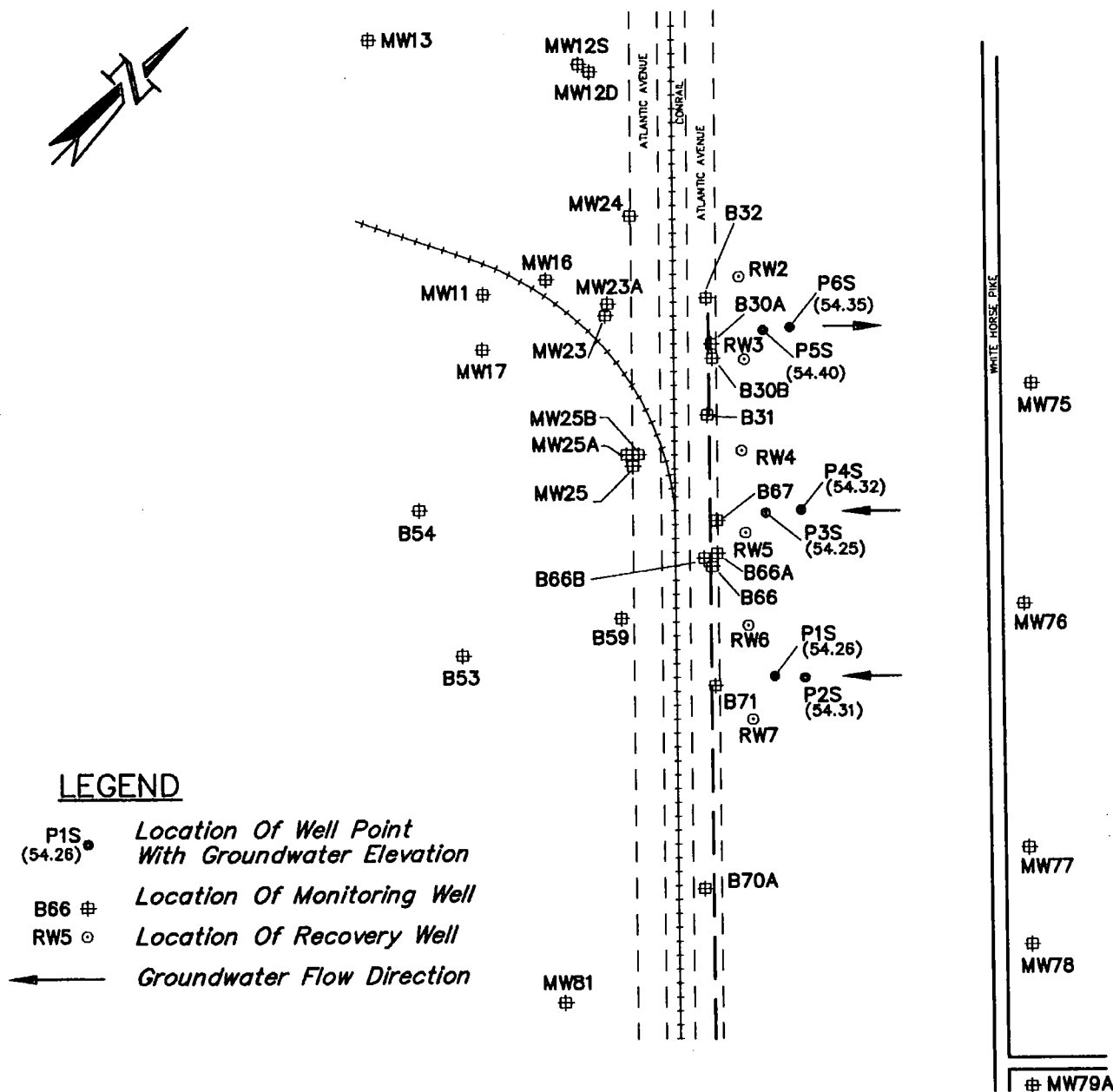
- B59 # Location Of Monitoring Well With TCE Concentration in ug/l
- RW5 o Location Of Recovery Well
- 1.0 — Line Of Equal TCE Concentration in ug/l (Dashed Where Inferred)

NOTE:

Base Map Obtained From Geraghty & Miller's August 1992 Groundwater Monitoring Report.

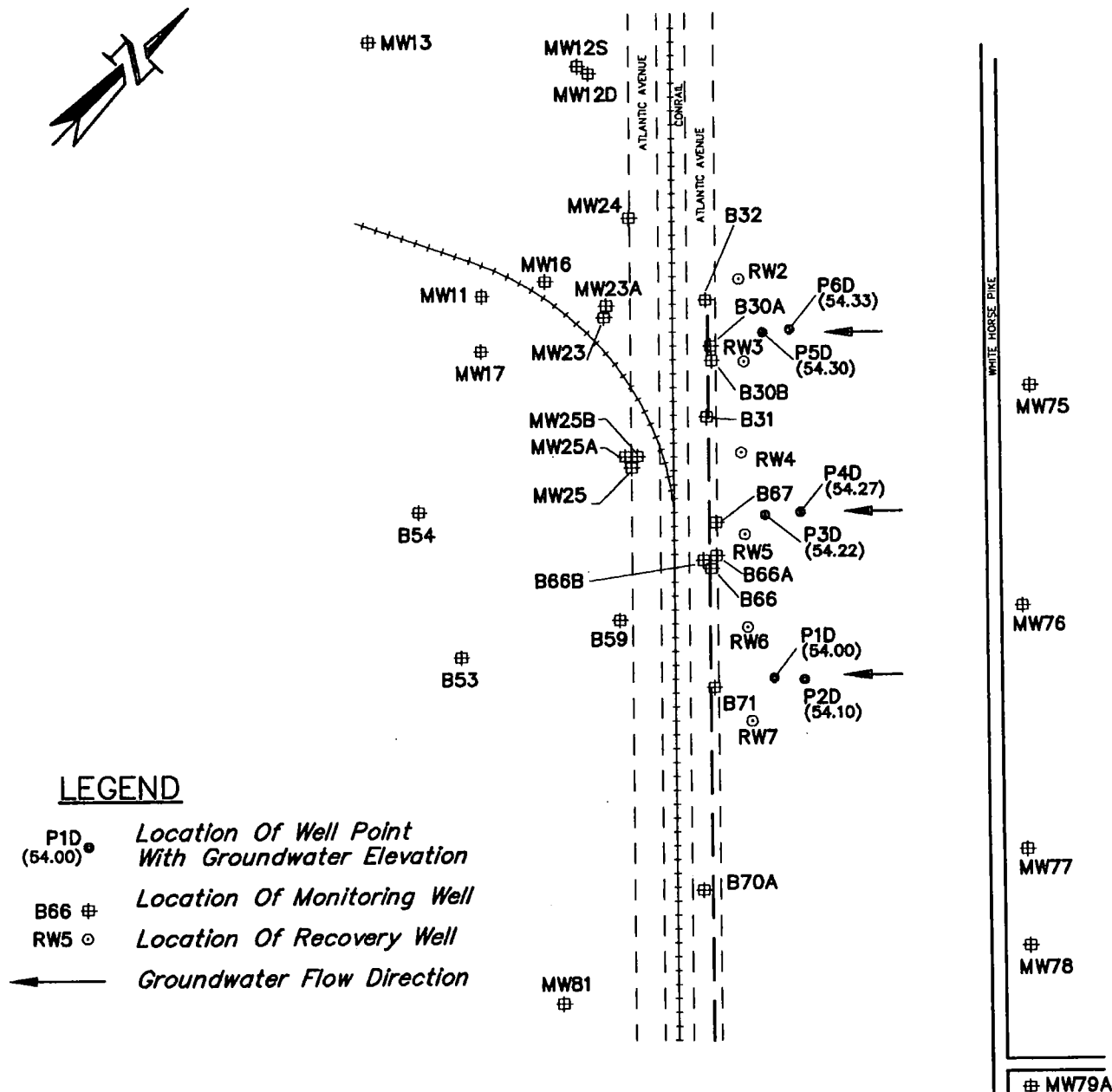
EXTENT OF TRICHLOROETHYLENE IN GROUNDWATER JANUARY 22-24, 2001

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GROUNDWATER FLOW MAP - SHALLOW WELLS JANUARY 22, 2001

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GROUNDWATER FLOW MAP - DEEP WELLS JANUARY 22, 2001

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**LENOX CHINA FACILITY AND ADJACENT AREA
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TABLE 1 SECTION 5

SUMMARY OF TRICHLOROETHENE CONCENTRATIONS IN GROUNDWATER

Well	July 12-13, 1999	October 18-19, 1999	January 18-19, 2000	April 10-11, 2000	July 10-12, 2000	October 16-17, 2000	January 22-24, 2001
MW1	<0.20	<0.20	<0.20	<0.20	<0.27	<0.27	<0.30
MW3	-	-	-	-	-	-	-
MW6	-	-	-	-	-	-	-
MW9	-	-	-	-	-	-	-
MW10	10.6/10.3	11.4/14.2	9.4/10.4	7.1/7.2	7.7/8	5.2	11.5
MW11	-	-	-	-	-	-	-
MW12S	1.1	1.8	1.7	1.8	1.7	1.5	1.7
MW12D	-	-	-	4.1	-	-	-
MW13	0.73	1.2/1.3	0.95	0.89	0.76	0.57	0.34
MW14S	-	-	-	-	-	-	-
MW14D	-	-	-	-	-	-	-
MW15	3.4	2.9	2.8	<0.20	1.3	1.4	1.8
MW16	-	-	-	-	-	-	-
MW17	-	-	-	-	-	-	-
MW23	-	-	-	9.5	-	-	-
MW23A	-	-	-	-	-	-	-
MW24	-	-	-	-	-	-	-
MW25	14.30	17.40	17.30	15.60	20.50	29.70	28.8
MW25A	-	-	-	-	-	-	-
MW25B	-	-	-	-	-	-	-
B30 (MW26)	-	-	-	-	-	-	-
B30A (MW26A)	-	-	-	-	-	-	-
B30B (MW26B)	-	-	-	-	-	-	-
B31 (MW27)	9.2	15.2	8.8	7.9	6.3	5.1	9.1
B32 (MW28)	-	-	-	13.3	-	-	-
B33 (MW29)	-	-	-	-	-	-	-
B52	-	-	-	-	-	-	-
B53	-	-	-	7.0	-	-	-
B54	-	-	-	106.0	-	-	-
B55	-	-	-	-	-	-	-
B56	-	-	-	-	-	-	-
B57	-	-	-	-	-	-	-
B58	-	-	-	-	-	-	-
B59	<0.20	13.1	18	22.8	10.2	5.3	5.2
B65	-	-	-	-	-	-	-
B66	-	-	-	24.4	-	-	-
B66A	-	-	-	-	-	-	-
B66B	-	-	-	-	-	-	-
B67	-	-	-	-	-	-	-
B68	-	-	-	-	-	-	-
B69	-	-	-	-	-	-	-
B70	-	-	-	-	-	-	-
B70A	-	-	-	-	-	-	-
B71	-	-	-	9.1	-	-	-
MW72	-	-	-	-	-	-	-
MW73	-	-	-	-	-	-	-
MW74	-	-	-	-	-	-	-
MW75	<0.20/<0.20	<0.20	<0.20	<0.20	<0.27	<0.27	<0.30
MW76	0.37	0.58	0.57	0.43	<0.27	<0.27	0.50
MW77	2.60	3.30	2.60	2.30	3.00	2.80	2.8
MW78	0.60	0.82	1.10	0.74	0.63	0.91	1.20
MW79A	1.40	2.10	1.50	1.30	1.80	2.60	1.0
MW80	<0.20	<0.20	<0.20	<0.20	<0.27	<0.27	<0.30
MW81	2.20	2.40	1.7/2.0	1.20	0.52	<0.27	1.1
P18	-	-	-	-	-	-	-
P19	-	-	-	-	-	-	-
P20	-	-	-	-	-	-	-
P21	-	-	-	-	-	-	-
P22	-	-	-	-	-	-	-
RW1	-	-	-	-	-	-	-
GAC Influent	31	25	25	26	19	17	3.58
GAC Effluent	<0.32	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
GAC Mid-Vessel	<0.32	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28

Notes:

All samples analyzed by USEPA Method 624, 601 or 502.2/524.2.

All concentrations are presented in micrograms per liter (ug/L).

- Not analyzed (well not installed in some cases).

Values in bold font exceed the site specific Groundwater Quality Criteria (GWQC).